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Fabrication process for producing silicon nanowire field effect transistors

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An important task to date is the development of new hybrid semiconductor/ferromagnet devices [1] that could become promising devices and play a role, both logic and memory, and could be produced within the same technology. Earlier, we already made similar structures using Deep Pen Nanolithography method [2], but due to a number of technical difficulties, we decided to abandon this technology and use a different approach.

In this work, we would like to show a simple technology for manufacturing Silicon Nanowire Field Effect Transistors and focus on the prospect of using such transistors not only as elements of microelectronics [3], but also as high-precision sensors for medical applications. A simple approach to manufacturing makes these devices advantageous candidates for use as test devices for studying the fundamental properties of materials. The technology described by us allows us to abandon the complex stage of silicon doping with impurities. And we also demonstrate a single exposure for electronic lithography, and the subsequent stage of liquid chemical etching.

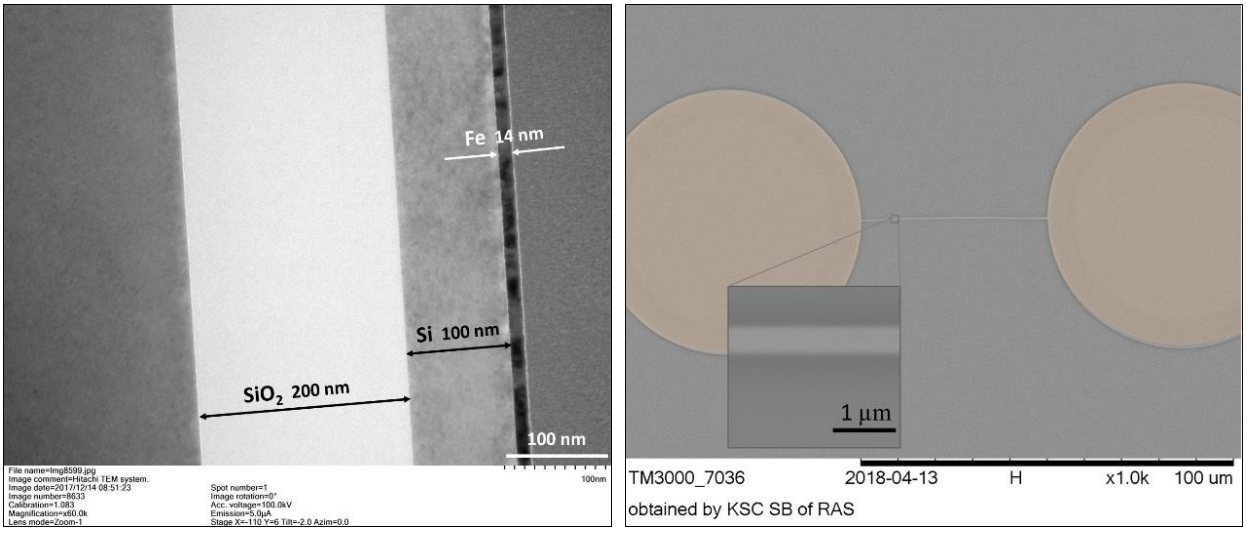

Figure 1. TEM image of Fe film deposed on SOI wafer (a).

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